



SEQUENCE LISTING

<110> TSUBOUCHI, Kozo
YAMADA, Hiromi

<120> EXTRACTION AND UTILIZATION OF CELL
GROWTH-PROMOTING PEPTIDES FROM SILK PROTEIN

<130> OPS 635

<140> US 10/789 494

<141> 2004-02-27

<150> JP 2003-55048

<151> 2003-02-28

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Val Ile Thr Thr Asp Ser Asp Gly Asn Glu
5 10

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<213> Bombyx mori

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Asn Ile Asn Asp Phe Asp Glu Asp
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Ala Ala Ser Ser Val Ser Ser Ala Ser Ser Arg Ser Tyr Asp Tyr Ser Arg Arg Asn Val
5 10 15 20

Arg Lys Asn

<210> 4

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<212> PRT

<213> Bombyx mori

<400> 4

Gly Ser Ser Gly Phe Gly Pro Tyr Val Ala His Gly Gly Tyr Ser Gly Tyr Glu Tyr Ala
5 10 15 20

Trp Ser Ser Glu Ser Asp Phe Gly Thr
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<212> PRT

<213> Antheraea yamamai

<400> 5
 Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser Asp Ser
 5 10

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<400> 6
 Asp Glu Tyr Val Asp Asn
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<400> 7
 Val Glu Thr Ile Val Leu Glu Glu Asp Pro Tyr Gly His Glu Asp Ile Tyr Glu Glu Asp
 5 10 15 20

<210> 8
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 Asp Asp Gly Phe Val Leu Asp Gly Gly Tyr Asp Ser Glu
 5 10

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 Met Arg Val Lys Thr Phe Val Ile Leu Cys Cys Ala Leu Gln Tyr Val Ala Tyr Thr Asn
 5 10 15 20
 Ala Asn Ile Asn Asp Phe Asp Glu Asp Tyr Phe Gly Ser Asp Val Thr Val Gln Ser Ser
 25 30 35 40
 Asn Thr Thr Asp Glu Ile Ile Arg Asp Ala Ser Gly Ala Val Ile Glu Glu Gln Ile Thr
 45 50 55 60
 Thr Lys Lys Met Gln Arg Lys Asn Lys Asn His Gly Ile Leu Gly Lys Asn Glu Lys Met
 65 70 75 80
 Ile Lys Thr Phe Val Ile Thr Thr Asp Ser Asp Gly Asn Glu Ser Ile Val Glu Glu Asp
 85 90 95 100
 Val Leu Met Lys Thr Leu Ser Asp Gly Thr Val Ala Gln Ser Tyr Val Ala Ala Asp Ala
 105 110 115 120
 Gly Ala Tyr Ser Gln Ser Gly Pro Tyr Val Ser Asn Ser Gly Tyr Ser Thr His Gln Gly
 125 130 135 140
 Tyr Thr Ser Asp Phe Ser Thr Ser Ala Ala Val
 145 150

<210> 10
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 <213> Bombyx mori

<400> 10

Gly	Ser	Ser	Gly	Phe	Gly	Pro	Tyr	Val	Ala	Asn	Gly	Gly	Tyr	Ser	Arg	Ser	Asp	Gly	Tyr
				5					10					15					20
Glu	Tyr	Ala	Trp	Ser	Ser	Asp	Phe	Gly	Thr										
				25					30										

<210> 11
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 <212> PRT
 <213> Bombyx mori

Gly	Ser	Ser	Gly	Phe	Gly	Pro	Tyr	Val	Ala	His	Gly	Gly	Tyr	Ser	Gly	Tyr	Glu	Tyr	Ala
				5					10					15					20
Trp	Ser	Ser	Glu	Ser	Asp	Phe	Gly	Thr											
				25															

<210> 12
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 <213> Bombyx mori

Gly	Ser	Ser	Gly	Phe	Gly	Pro	Tyr	Val	Ala	Asn	Gly	Gly	Tyr	Ser	Gly	Tyr	Glu	Tyr	Ala
				5					10					15					20
Trp	Ser	Ser	Glu	Ser	Asp	Phe	Gly	Thr											
				25															

<210> 13
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 <213> Bombyx mori

Gly	Ser	Ser	Gly	Phe	Gly	Pro	Tyr	Val	Ala	His	Gly	Gly	Tyr	Ser	Gly	Tyr	Glu	Tyr	Ala
				5					10					15					20
Trp	Ser	Ser	Glu	Ser	Asp	Phe	Gly	Thr											
				25															

<210> 14
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 <213> Bombyx mori

Gly	Ser	Ser	Gly	Phe	Gly	Pro	Tyr	Val	Ala	His	Gly	Gly	Tyr	Ser	Gly	Tyr	Glu	Tyr	Ala
				5					10					15					120
Trp	Ser	Ser	Glu	Ser	Asp	Phe	Gly	Thr											
				25															

<210> 15
 <211> 29
 <212> PRT
 <213> Bombyx mori

Gly	Ser	Ser	Gly	Phe	Gly	Pro	Tyr	Val	Ala	Asn	Gly	Gly	Tyr	Ser	Gly	Tyr	Glu	Tyr	Ala
				5					10					15					20
Trp	Ser	Ser	Glu	Ser	Asp	Phe	Gly	Thr											
				25															

<210> 16

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<213> Bombyx mori

<400> 16
Gly Ser Ser Gly Phe Gly Pro Tyr Val Ala Asn Gly Gly Tyr Ser Gly Tyr Glu Tyr Ala
5 10 15 20
Trp Ser Ser Glu Ser Asp Phe Gly Thr
25

<210> 17
<211> 29
<212> PRT
<213> Bombyx mori

<400> 17
Gly Ser Ser Gly Phe Gly Pro Tyr Val Ala Asn Gly Gly Tyr Ser Gly Tyr Glu Tyr Ala
5 10 15 20
Trp Ser Ser Glu Ser Asp Phe Gly Thr
25

<210> 18
<211> 28
<212> PRT
<213> Bombyx mori

<400> 18
Gly Ser Ser Gly Phe Gly Pro Tyr Val Asn Gly Gly Tyr Ser Gly Tyr Glu Tyr Ala Trp
5 10 15 20
Ser Ser Glu Ser Asp Phe Gly Thr
25

<210> 19
<211> 29
<212> PRT
<213> Bombyx mori

<400> 19
Gly Ser Ser Gly Phe Gly Pro Tyr Val Ala Asn Gly Gly Tyr Ser Gly Tyr Glu Tyr Ala
5 10 15 20
Trp Ser Ser Glu Ser Asp Phe Gly Thr
25

<210> 20
<211> 32
<212> PRT
<213> Bombyx mori

<400> 20
Gly Ser Ser Gly Phe Gly Pro Tyr Val Ala Asn Gly Gly Tyr Ser Arg Arg Glu Gly Tyr
5 10 15 20
Glu Tyr Ala Trp Ser Ser Lys Ser Asp Phe Glu Thr
25 30

<210> 21
<211> 43
<212> PRT
<213> Bombyx mori

<400> 21
Ala Ala Ser Ser Val Ser Ser Ala Ser Ser Arg Ser Tyr Asp Tyr Ser Arg Arg Asn Val

	5								10					15				20
Arg	Lys	Asn	Cys	Gly	Ile	Pro	Arg	Arg	Gln	Leu	Val	Val	Lys	Phe	Arg	Ala	Leu	Pro
				25					30					35				40
Val	Asn	Cys																

<210> 22
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 <212> PRT
 <213> Bombyx mori

<400> 22																		
Met	Lys	Pro	Ile	Phe	Leu	Val	Leu	Leu	Val	Ala	Thr	Ser	Ala	Tyr	Ala	Ala	Pro	Ser
				5					10					15				20
Thr	Ile	Asn	Gln	Tyr	Ser	Asp	Asn	Glu	Ile	Pro	Arg	Asp	Ile	Asp	Asp	Gly	Lys	Ala
				25					30					35				40
Ser	Val	Ile	Ser	Arg	Ala	Trp	Asp	Tyr	Val	Asp	Asp	Thr	Asp	Lys	Ser	Ile	Ala	Ile
				45					50					55				60
Asn	Val	Gln	Glu	Ile	Leu	Lys	Asp	Met	Ala	Ser	Gln	Gly	Asp	Tyr	Ala	Ser	Gln	Ala
				65					70					75				80
Ser	Val	Ala	Gln	Thr	Ala	Gly	Ile	Ile	Ala	His	Leu	Ser	Ala	Gly	Ile	Pro	Gly	Asp
				85					90					95				100
Cys	Ala	Ala	Ala	Asn	Val	Ile	Asn	Ser	Tyr	Thr	Asp	Gly	Val	Arg	Ser	Gly	Asn	Phe
				105					110					115				120
Gly	Phe	Arg	Gln	Ser	Leu	Gly	Pro	Phe	Phe	Gly	His	Val	Gly	Gln	Asn	Leu	Asn	Leu
				125					130					135				140
Asn	Gln	Leu	Val	Ile	Asn	Pro	Gly	Gln	Leu	Arg	Tyr	Ser	Val	Gly	Pro	Ala	Leu	Gly
				145					150					155				160
Ala	Gly	Gly	Gly	Arg	Ile	Tyr	Asp	Phe	Glu	Ala	Ala	Trp	Asp	Ala	Ile	Leu	Ala	Ser
				165					170					175				180
Asp	Ser	Ser	Phe	Leu	Asn	Glu	Glu	Tyr	Cys	Ile	Val	Lys	Arg	Leu	Tyr	Asn	Ser	Arg
				185					190					195				200
Ser	Gln	Ser	Asn	Asn	Ile	Ala	Ala	Tyr	Ile	Thr	Ala	His	Leu	Leu	Pro	Pro	Val	Ala
				205					210					215				220
Val	Phe	His	Gln	Ser	Ala	Gly	Ser	Ile	Thr	Asp	Leu	Leu	Arg	Gly	Val	Gly	Asn	Gly
				225					230					235				240
Asp	Ala	Thr	Gly	Leu	Val	Ala	Asn	Ala	Gln	Arg	Tyr	Ile	Ala	Gln	Ala	Ala	Ser	Gln
				245					250					255				260
His	Val																	

<210> 23
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 <213> Antheraea yamamai

<400> 23																		
Met	Arg	Val	Thr	Ala	Phe	Val	Ile	Leu	Cys	Cys	Ala	Leu	Gln	Tyr	Ala	Thr	Ala	Asn
				5					10					15				20
Leu	His	His	His	Asp	Glu	Tyr	Val	Asp	Asn	His	Gly	Gln	Leu	Val	Glu	Arg	Phe	Thr
				25					30					35				40
Arg	Lys	His	Tyr	Glu	Arg	Asn	Ala	Ala	Thr	Arg	Pro	His	Leu	Ser	Gly	Asn	Glu	Arg
				45					50					55				60
Val	Glu	Thr	Ile	Val	Leu	Glu	Glu	Asp	Pro	Tyr	Gly	His	Glu	Asp	Ile	Tyr	Glu	Glu
				65					70					75				80
Val	Val	Ile	Asn	Arg	Val	Pro	Gly	Ala	Ser	Ser	Ser	Ala	Ala	Ala	Ala	Ser	Ser	Ala
				85					90					95				100
Ala	Gly	Ser	Gly	Gln	Thr	Ile	Ile	Val	Glu	Arg	Gln	Ala	Ser	His	Gly	Ala	Gly	Gly
				105					110					115				120

<210> 24
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<213> Antheraea yamamai

<400> 24

Ala Gly Ala Ala Ala Gly Ala Ala Ala Gly Ser Ser Ala Arg Gly Gly
5 10 15

<210> 25

<211> 45

<212> PRT

<213> Antheraea yamamai

<400> 25

Ser Gly Phe Tyr Glu Thr His Asp Ser Tyr Ser Ser Tyr Gly Ser Gly Ser Ser Ser Ala
5 10 15 20
Ala Ala Ala Ser Ser Gly Ala Gly Gly Ala Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly
25 30 35 40
Tyr Gly Ser Asp Ser
45

<210> 26

<211> 17

<212> PRT

<213> Anthraea yamamai

<400> 26

Gly Ser Gly Ala Gly Gly Arg Gly Asp Gly Gly Tyr Gly Ser Gly Ser Ser
5 10 15

<210> 27

<211> 27

<212> PRT

<213> Antheraea yamamai

<400> 27

Arg Arg Ala Gly His Asp His Ala Ala Gly Ser Ser Gly Gly Gly Tyr Ser Trp Asp Tyr
5 10 15 20
Ser Ser Tyr Gly Ser Glu Ser
25

<210> 28

<211> 23

<212> PRT

<213> Antheraea yamamai

<400> 28

Gly Ser Gly Ala Gly Gly Val Gly Gly Gly Tyr Gly Gly Gly Asp Gly Gly Tyr Gly Ser
5 10 15 20
Gly Ser Ser

<210> 29

<211> 11

<212> PRT

<213> Antheraea yamamai

<400> 29

Arg Arg Ala Gly His Asp Arg Ala Ala Gly Ser
5 10

<210> 30

<211> 21

<212> PRT

<213> Antheraea yamamai

<400> 30

Ser Gly Ala Gly Gly Ser Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser Asp
5 10 15 20
Ser

<210> 31

<211> 8

<212> PRT

<213> Antheraea yamamai

<400> 31

Gly Ser Gly Ala Gly Arg Ala Gly
5

<210> 32

<211> 14

<212> PRT

<213> Antheraea yamamai

<400> 32

Gly Asp Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser Asp Ser
5 10

<210> 33

<211> 11

<212> PRT

<213> Antheraea yamamai

<400> 33

Arg Gln Ala Gly His Glu Arg Ala Ala Gly Ser
5 10

<210> 34

<211> 21

<212> PRT

<213> Antheraea yamamai

<400> 34

Ser Gly Ala Gly Gly Ser Gly Arg Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser Asp
5 10 15 20
Ser

<210> 35

<211> 21

<212> PRT

<213> Antheraea yamamai

<400> 35

Gly Ser Gly Ala Gly Gly Ala Gly Gly Asp Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser
5 10 15 20
Asp

<210> 36

<211> 22

<212> PRT

<213> Antheraea yamamai

<400> 36

Gly Ser Gly Ala Gly Gly Ala Gly Gly Asp Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser
5 10 15 20
Asp Ser

<210> 37
<211> 21
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<213> Antheraea yamamai

<400> 37
Ser Gly Ala Gly Gly Ala Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser Asp
5 10 15 20
Ser

<210> 38
<211> 16
<212> PRT
<213> Antheraea yamamai

<400> 38
Ser Gly Ala Gly Gly Ala Gly Gly Tyr Gly Gly Tyr Gly Ser Asp Ser
5 10 15

<210> 39
<211> 21
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<400> 39
Ser Gly Ala Gly Gly Ser Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser Gly
5 10 15 20
Ser

<210> 40
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<213> Antheraea yamamai

<400> 40
Gly Ser Gly Ala Gly Gly Val Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser
5 10 15 20
Asp Ser

<210> 41
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<213> Antheraea yamamai

<400> 41
Ser Gly Ala Gly Gly Arg Gly Asp Gly Gly Tyr Gly Ser Gly Ser Ser
5 10 15

<210> 42
<211> 22
<212> PRT
<213> Antheraea yamamai

<400> 42
Gly Ser Gly Ala Gly Gly Ala Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser
5 10 15 20
Asp Ser

<210> 43
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<213> Antheraea yamamai

<400> 43
Arg Arg Ala Gly His Asp Arg Ala Ala Gly Cys
5 10

<210> 44
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<213> Antheraea yamamai

<400> 44
Ser Gly Ala Gly Gly Thr Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser Asp
5 10 15 20
Ser

<210> 45
<211> 21
<212> PRT
<213> Antheraea yamamai

<400> 45
Ser Gly Ala Gly Gly Ser Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser Asn
5 10 15 20
Ser

<210> 46
<211> 21
<212> PRT
<213> Antheraea yamamai

<400> 46
Ser Gly Ala Gly Arg Ser Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Ser Ser Asp
5 10 15 20
Ser

<210> 47
<211> 16
<212> PRT
<213> Antheraea yamamai

<400> 47
Ser Gly Ala Gly Gly Ser Gly Gly Tyr Gly Gly Tyr Gly Ser Asp Ser
5 10 15

<210> 48
<211> 25
<212> PRT
<213> Antheraea yamamai

<400> 48
Gly Ser Gly Ala Gly Gly Val Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Gly
5 10 15 20
Tyr Gly Ser Asp Ser
25

<210> 49
<211> 23

<212> PRT

<213> Antheraea yamamai

<400> 49

Gly Ser Gly Ala Gly Gly Val Gly Gly Gly Tyr Gly Arg Gly Asp Ser Gly Tyr Gly Ser
5 10 15 20
Gly Ser Ser

<210> 50

<211> 8

<212> PRT

<213> Antheraea yamamai

<400> 50

Gly His Gly Arg Ser Ser Gly Ser
5

<210> 51

<211> 21

<212> PRT

<213> Antheraea yamamai

<400> 51

Ser Gly Ala Gly Gly Ser Gly Gly Gly Tyr Gly Trp Asp Tyr Gly Ser Tyr Gly Ser Asp
5 10 15 20
Ser

<210> 52

<211> 22

<212> PRT

<213> Antheraea yamamai

<400> 52

Ser Ser Gly Ala Gly Gly Ser Gly Gly Gly Tyr Gly Trp Asp Tyr Gly Gly Tyr Gly Ser
5 10 15 20
Asp Ser

<210> 53

<211> 22

<212> PRT

<213> Antheraea yamamai

<400> 53

Gly Ser Gly Ala Gly Gly Ser Gly Gly Gly Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser
5 10 15 20
Asp Ser

<210> 54

<211> 14

<212> PRT

<213> Antheraea yamamai

<400> 54

Ser Arg Arg Ala Gly His Asp Arg Ala Tyr Gly Ala Gly Ser
5 10

<210> 55

<211> 28

<212> PRT

<213> Antheraea yamamai

<400> 55

Gly Ala Gly Ala Ser Arg Pro Val Gly Ile Tyr Gly Thr Asp Asp Gly Phe Val Leu Asp
5 10 15 20
Gly Gly Tyr Asp Ser Glu Gly Ser
25

<210> 56

<211> 34

<212> PRT

<213> *Antheraea yamamai*

<400> 56

Ser Ser Ser Gly Arg Ser Thr Glu Gly His Pro Leu Leu Ser Ile Cys Cys Arg Pro Cys
5 10 15 20
Ser His Arg His Ser Tyr Glu Ala Ser Arg Ile Ser Val His
25 30

<210> 57

<211> 22

<212> PRT

<213> *Bombyx mori*

<400> 57

Gly Ala Gly Ala Gly Ser Gly Ala Gly Ala Gly Ser Gly Ala Gly Ala Gly Tyr Gly Ala
5 10 15 20
Gly Tyr

<210> 58

<211> 22

<212> PRT

<213> *Bombyx mori*

<400> 58

Gly Ala Gly Ala Gly Ser Gly Ala Ala Ser Gly Ala Gly Ala Gly Ala Gly Ala Gly Ala
5 10 15 20
Gly Thr

<210> 59

<211> 23

<212> PRT

<213> *Bombyx mori*

<400> 59

Ala Ala Ser Ser Val Ser Ser Ala Ser Ser Arg Ser Tyr Asp Tyr Ser Arg Arg Asn Val
5 10 15 20
Arg Lys Asn

<210> 60

<211> 29

<212> PRT

<213> *Bombyx mori*

<400> 60

Gly Ser Ser Gly Phe Gly Pro Tyr Val Ala His Gly Gly Tyr Ser Gly Tyr Glu Tyr Ala
5 10 15 20
Trp Ser Ser Glu Ser Asp Phe Gly Thr
25

<210> 61

<211> 10

<212> PRT

<213> Antheraea yamamai

<400> 61

Ala Ala Ala Ala Ala Ala Ala Ala Ala Ala
5 10

<210> 62

<211> 12

<212> PRT

<213> Antheraea yamamai

<400> 62

Tyr Gly Trp Gly Asp Gly Gly Tyr Gly Ser Asp Ser
5 10

<210> 63

<211> 16

<212> PRT

<213> Antheraea yamamai

<400> 63

Ser Gly Ala Gly Gly Ser Gly Gly Tyr Gly Gly Tyr Gly Ser Asp Ser
5 10 15

<210> 64

<211> 17

<212> PRT

<213> Antheraea yamamai

<400> 64

Gly Ser Gly Ala Gly Gly Arg Gly Asp Gly Gly Tyr Gly Ser Gly Ser Ser
5 10 15

<210> 65

<211> 11

<212> PRT

<213> Antheraea yamamai

<400> 65

Arg Arg Ala Gly His Asp Arg Ala Ala Gly Ser
5 10

<210> 66

<211> 6

<212> PRT

<213> Antheraea yamamai

<400> 66

Asp Glu Tyr Val Asp Asn
5

<210> 67

<211> 20

<212> PRT

<213> Antheraea yamamai

<400> 67

Val Glu Thr Ile Val Leu Glu Glu Asp Pro Tyr Gly His Glu Asp Ile Tyr Glu Glu Asp
5 10 15 20

<210> 68

<211> 13
<212> PRT
<213> *Antheraea yamamai*

<400> 68
Asp Asp Gly Phe Val Leu Asp Gly Gly Tyr Asp Ser Glu
5 10

<210> 69
<211> 6
<212> PRT
<213> *Bombyx mori*

<400> 69
Gly Ala Gly Ala Gly Ser
5

<210> 70
<211> 6
<212> PRT
<213> *Bombyx mori*

<400> 70
Asp Ser Asp Gly Asp Glu
5

<210> 71
<211> 6
<212> PRT
<213> *Bombyx mori*

<400> 71
Asp Glu Asp Glu Asp Glu
5

<210> 72
<211> 6
<212> PRT
<213> *Bombyx mori*

<400> 72
Glu Asp Glu Asp Glu Asp
5

<210> 73
<211> 6
<212> PRT
<213> *Bombyx mori*

<400> 73
Ser Ser Glu Ser Ser Glu
5

<210> 74
<211> 6
<212> PRT
<213> *Bombyx mori*

<400> 74
Tyr Gly Gly Tyr Glu Tyr
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<210> 75
<211> 7
<212> PRT
<213> Antheraea yamamai

<400> 75
Asp Gly Gly Tyr Gly Gly Asp
5

<210> 76
<211> 6
<212> PRT
<213> Antheraea yamamai

<400> 76
Asp Glu Tyr Asp Glu Tyr
5

<210> 77
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<213> Antheraea yamamai

<400> 77
Tyr Glu Glu Asp Tyr Glu Glu Asp
5

<210> 78
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<213> Artificial sequence

<220>
<223> Cell growth promoting activity

<400> 78
Glu Glu Glu Glu

<210> 79
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<212> PRT
<213> Artificial sequence

<220>
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<400> 79
Glu Glu Glu Glu Glu Glu
5

<210> 80
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<220>
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<400> 80
Glu Tyr Glu Tyr Glu Tyr

<210> 81
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<220>
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<400> 81
Glu Glu Tyr Glu Glu Tyr
5

<210> 82
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<212> PRT
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<220>
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<400> 82
Tyr Tyr Tyr Tyr Tyr Tyr
5

<210> 83
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<220>
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<400> 83
Glu Gly Ser Glu Gly Ser
5

<210> 84
<211> 10
<212> PRT
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<220>
<223> Cell growth promoting activity

<400> 84
Glu Glu Glu Glu Glu Glu Glu Glu Glu
5 10

<210> 85
<211> 4
<212> PRT
<213> Artificial sequence

<220>
<223> Cell growth promoting activity

<400> 85
Tyr Tyr Tyr Tyr